Bronchodilators

Definition

- Bronchodilators are medications that **relax bronchial smooth muscle**, leading to **airway dilation**, which improves airflow.
- They are primarily used in the treatment of **asthma**, **chronic obstructive pulmonary disease (COPD)**, and other conditions causing bronchospasm.

Classification

1. Beta-2 Adrenergic Agonists

- **Short-acting (SABA):** Salbutamol (Albuterol), Terbutaline
- **Long-acting (LABA):** Salmeterol, Formoterol
- **Ultra-long-acting:** Indacaterol, Vilanterol

2. Anticholinergics (Muscarinic Antagonists)

- **Short-acting (SAMA):** Ipratropium bromide
- **Long-acting (LAMA):** Tiotropium, Aclidinium

3. Methylxanthines

- Theophylline, Aminophylline

4. Others

- **Leukotriene receptor antagonists:** Montelukast (mild bronchodilation + anti-inflammatory)
- **Biologics (monoclonal antibodies):** Omalizumab (for allergic asthma)

Pharmacological Actions

Class	Mechanism of Action
Beta-2 agonists	Stimulate β2 receptors → ↑ cAMP → smooth muscle relaxation
Anticholinergics	Block M3 receptors → ↓ vagal tone → bronchodilation
Methylxanthines	Inhibit phosphodiesterase → ↑ cAMP → bronchodilation
Montelukast	Blocks leukotriene D4 → ↓ bronchoconstriction & inflammation

Dose *(examples)*

Copyright © 2025 by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

Drug	Route & Typical Dose
Salbutamol	Inhalation: 100 mcg/puff, 1–2 puffs every 4–6 hours
Salmeterol	Inhalation: 50 mcg twice daily
Ipratropium	Inhalation: 20 mcg/puff, 2–4 times daily
Tiotropium	Inhalation: 18 mcg once daily
Theophylline	Oral: 200–400 mg/day (adjusted by blood levels)

Indications

- Bronchial asthma
- COPD
- Exercise-induced bronchospasm
- **Acute severe asthma** (SABA + steroids)
- Anaphylaxis (adjuvant with epinephrine)

Contraindications

- **Beta-2 agonists**: Cardiac arrhythmias, hyperthyroidism, caution in heart disease
- **Anticholinergics**: Glaucoma, prostatic hypertrophy, bladder obstruction
- **Methylxanthines**: Seizure disorders, cardiac arrhythmias, liver disease
- **Montelukast**: Known hypersensitivity, not for acute attacks

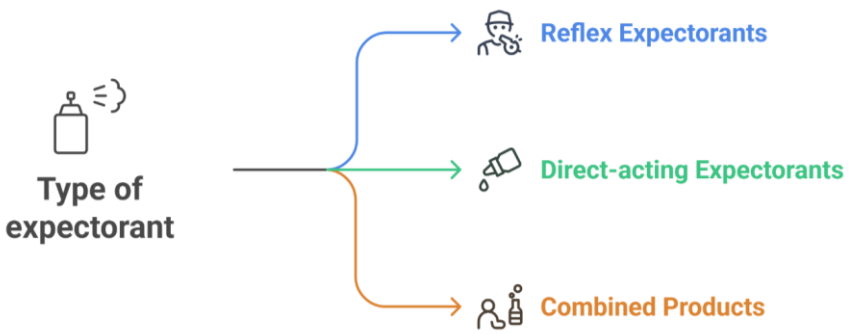
---

Expectorants

Definition

- Expectorants are agents that **increase bronchial secretion or reduce mucus viscosity**, facilitating **mucus expulsion** from the respiratory tract.
- They are commonly used in **productive cough**.

Classification



Copyright © 2025 by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

1. Reflex Expectorants

- Act by gastric irritation → reflexly ↑ bronchial secretion
- *Examples:* Guaifenesin, Ipecacuanha

2. Direct-acting Expectorants

- Stimulate bronchial glands directly
- *Examples:* Potassium iodide, Sodium citrate

3. Combined Products

- Expectorants + bronchodilators + antihistamines (e.g., cough syrups)

Pharmacological Actions

- **Guaifenesin:** Enhances output of respiratory tract fluid → facilitates ciliary action and mucus clearance
- **Ipecac:** Low doses stimulate bronchial secretion via vagal reflex
- **Potassium iodide:** Increases fluidity of mucus

Dose *(examples)*

Drug	Typical Dose
Guaifenesin (oral)	200–400 mg every 4 hours (max 2.4 g/day)
Potassium iodide (oral)	300–600 mg/day in divided doses
Ipecacuanha syrup (low dose)	5–10 drops with caution (rarely used now)

Indications

- **Productive cough** due to:
  - Acute bronchitis
  - Chronic bronchitis
  - Respiratory infections
  - Mild asthma/COPD with mucus buildup
- **Adjunct in sputum induction** for diagnostic tests

Contraindications

- **Guaifenesin**: Hypersensitivity (rare), not recommended for children under 2 years
- **Potassium iodide**: Thyroid disorders, pregnancy, iodism
- **Ipecacuanha**: Not for long-term use; has emetic effects at higher doses

Copyright © 2025 by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

- **All expectorants**: Non-productive (dry) cough, as they may worsen discomfort

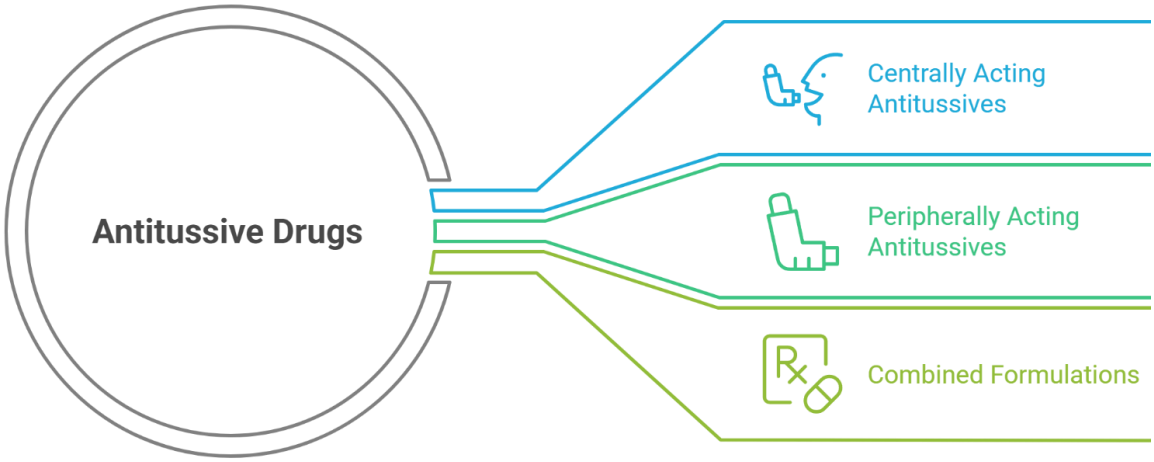
---

Anti-Tussive Agents (Cough Suppressants)

Definition

- Anti-tussives are drugs that suppress the cough reflex, either by acting centrally on the cough center in the medulla or peripherally on the respiratory tract receptors.
- They are mainly used for **dry, irritating, or non-productive cough**.

Classification



1. Centrally Acting Anti-Tussives

- **Opioid derivatives:**
  - *Codeine*, *Pholcodine*, *Hydrocodone*
- **Non-opioids:**
  - *Dextromethorphan*, *Noscapine*, *Butamirate*

2. Peripherally Acting Anti-Tussives

- *Benzonatate*, *Menthol*, *Local anesthetics (e.g., lidocaine sprays)*

3. Combined Formulations

- Antitussives + antihistamines + decongestants in cough syrups

Pharmacological Actions

Class	Action
Opioids	Depress the cough center in medulla (highly effective, potential for dependence)
Non-opioids	Act centrally but without opioid side effects

Copyright © 2025 by Engacy Learning Private Limited. All rights reserved. Reproduction or distribution without written consent is strictly prohibited.

First Hope

FREE PREVIEW

Click here to visit our website

PHARMACY PREMIUM NOTES

Complete subject and semesters are available on FirstHope app only.

Scan or click here

Click here to get the app >

Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram >

Scan or click here

@FirstHopeNotes

Instagram

@firsthope.official

Click here to follow >

YouTube channel

FirstHope-Pharmacy / Live streams

Click here to watch >

WhatsApp channel

Follow FirstHope on WhatsApp

Click here to join >

FirstHope website

firsthope.co.in

Click here to visit >

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Preview notes. Complete subjects and semesters in the FirstHope app.